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ABSTRACT

This paper provides an overview of technology in education and in the workplace. It includes information, presented in charts and graphs, on the following: (1) students' and workers' access to state-of-the-art education and training technology; (2) the readiness of educators and trainers to incorporate technology into the learning environment; (3) the content of curricula and training materials using the technology medium; and (4) the performance outcomes resulting from incorporating technology into the learning process. Some of the conclusions drawn from the data are as follows: public schools are viewed as "behind the times" in using computers; little attention is being paid to training teachers to use technology; by the year 2000, 95 percent of public schools expect to have Internet access; training for higher education is widely available, but more than one-fourth of the institutions do not provide training in developing curricula for distance learning courses; more than half of teachers do not use computers for mathematics instruction, and more than half of 11th-grade students do not use computers in the classroom; nearly half of the U.S. work force use computers in their jobs, including more than half of workers with less than college education; higher education is integrating technology into the curriculum, and distance education is becoming more common; the use of technology to deliver work-related training is increasing rapidly. (KC)

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ED 415 370

DECEMBER 1997

NATIONAL ALLIANCE OF BUSINESS

WORKFORCE ECONOMICS TRENDS

THE BUSINESS VOICE ON WORKFORCE DEVELOPMENT

Enhancing Education and Training Through Technology

The term classroom no longer means a room, designated for learning, with desks and a chalkboard. Through the Internet and widespread use of e-mail and the instantaneous transmission of data and information, the world is literally at the fingertips of today's students, teachers, trainers and trainees. Technology is revolutionizing every aspect of our lives, including the way we teach and how we train our employees.

With the explosion of technology in the workplace, skill level requirements are being ratcheted up by employers. Inventory, sales, marketing, expense analysis, communication, and correspondence are all being done faster, better, and cheaper, and with greater efficiency in the workplace today, through the use of technology. Preparing students and employees to effectively use technology is a challenge facing today's educators and trainers. At the same time technology also holds promise to help educate students and train workers faster, better, and cheaper.

Richard C. Notebaert, Chairman and CEO of Ameritech, recently stated, *"Our challenge is to address the needs of entry-level workers as well as mid-career hires, and to make the wise use of technology the catalyst for achieving our new environment"*.

While the data presented points to a proliferation of computers in schools and in the workplace, we cannot lay claim to being technologically proficient simply by installing state-of-the-art computers. Other factors will have a true impact on the future performance of students and workers in the new workplace. We need to consider:

- Access that students and workers have to state-of-the-art education and training technology;
- The readiness of educators and trainers to incorporate technology into the learning environment;
- The content of curricula and training materials using the technology medium;
- And most importantly, the performance outcomes resulting from incorporating technology into the learning process.

The data presented here is intended to provide an overview of technology in education and the workplace. In our research we discovered a lack of data which measures the impact of technology on learning both in schools and in the workplace. This reinforces the fact that we've only just embarked on the use of this new medium to enhance learning. How we use it demands careful consideration and ongoing monitoring of its impact.

Workforce Economics Trends is a compilation prepared by the Alliance of research profiling our nation's current and future workforce. The information --- statistics, facts and demographics --- highlighted are intended to help advance efforts to build a quality workforce.

Alliance members receive *Workforce Economics Trends* six times per year, bimonthly. Further information and analysis about the state of the American workforce are provided through the Alliance's newsletters --- *Work America*, *Workforce Economics* and our faxed bulletin *Legislative Update*.

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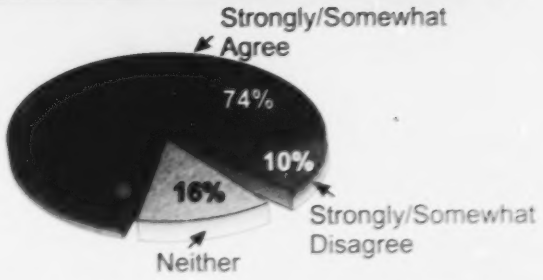
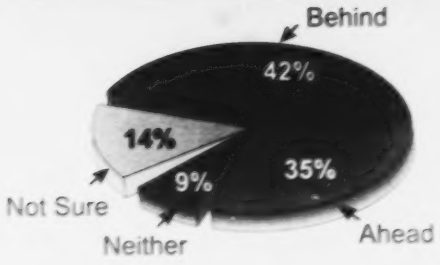
Public Perception About Technology in Schools...

Four of ten persons interviewed think their local public schools are behind the curve in using computers and current technology to teach students. Nearly three out of four persons interviewed think computers would improve education quality.

Would Computers Improve Education Quality?



Are Schools Ahead or Behind The Technology Curve?

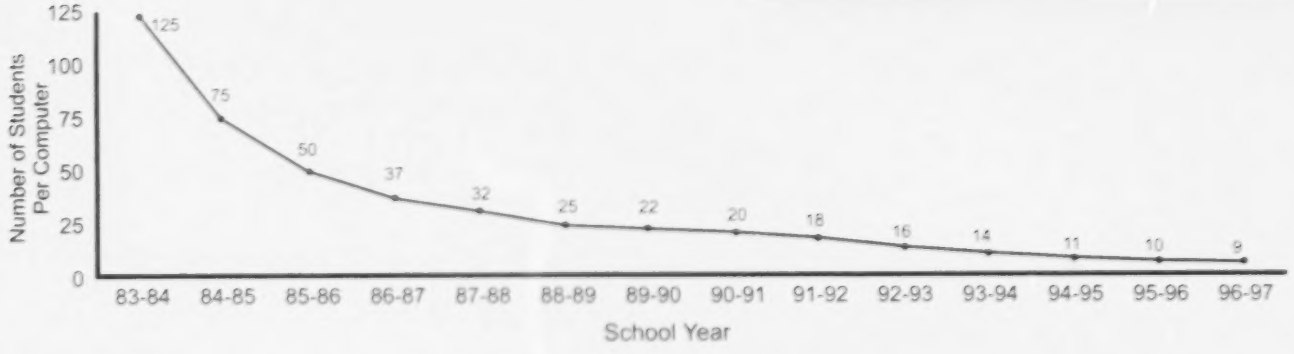


Source: Peter D. Hart Research Associates and National Computing Survey.

Computer Availability Over Time...

The number of computers per student has declined substantially over the last 15 years.

Students Per Computer Has Declined

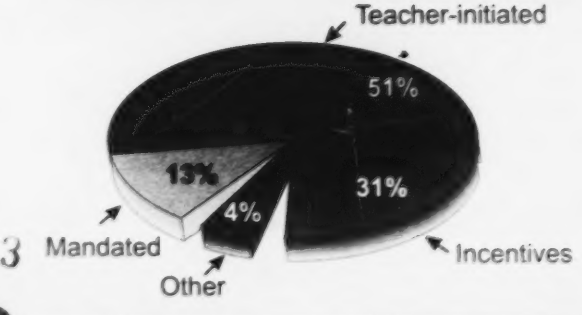


Source: CEO Forum on Education and Technology, School Technology and Readiness Report, 1997.

Teacher Training...

Great strides are being made in making computers available to schools, but little attention is being paid to teacher training. In the majority of school districts there is neither instruction nor incentives for teachers to receive technology training.

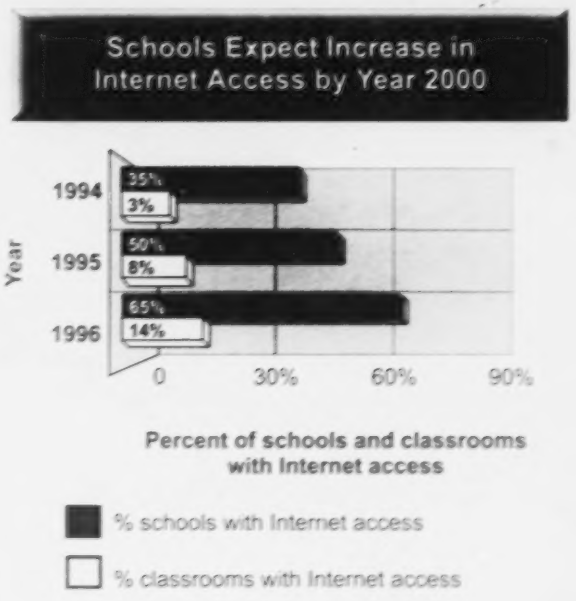
Percentage of Technology Training



Source: National Center for Education Statistics: Advanced Telecommunications in Public Elementary and Secondary Schools, Fall 1996.

Schools On The Net...

Public schools are being connected to the net, but not necessarily the classroom. By the year 2000, 95% of public schools expect to have Internet access. Preliminary research shows that students utilizing online resources learn to become independent, critical thinkers through finding, organizing, and evaluating information.



Source: National Center for Education Statistics: Advanced Telecommunications in Public Elementary and Secondary Schools, Fall 1996.

Training Opportunities for Faculty in Two-Four Year Institutions...

Training for higher education faculty is widely available. However, over one-fourth of the institutions do not provide training in developing curricula for distance learning courses.

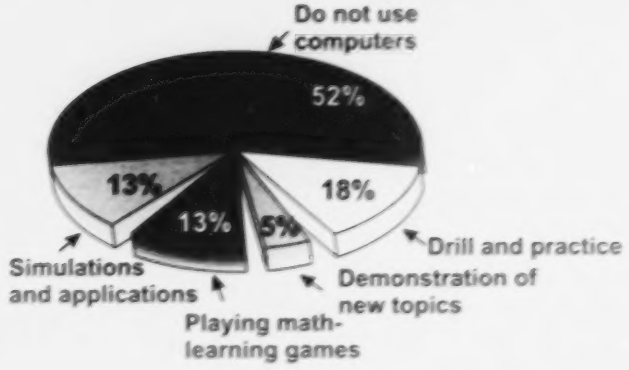
Training Opportunity	% Required	% Available	% Not Available
Training in the use and application of distance education technologies	27	59	14
Training in the development of curricula for distance courses	13	60	27
Training in teaching methods for distance education courses	17	63	19
Consultation with technology support staff	28	64	8

Source: National Center for Education Statistics: Distance Education in Higher Education Institutions, Oct. 1997.

Use in the Classroom...

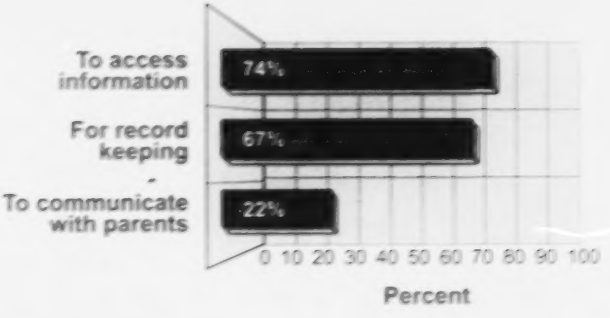
There is still great uncertainty in how technology should be used in the classroom. More than one-half of the teachers do not use computers in teaching math, and nearly 60% of 11th graders report using a computer less than once a week or never.

How teachers use computers for math instruction



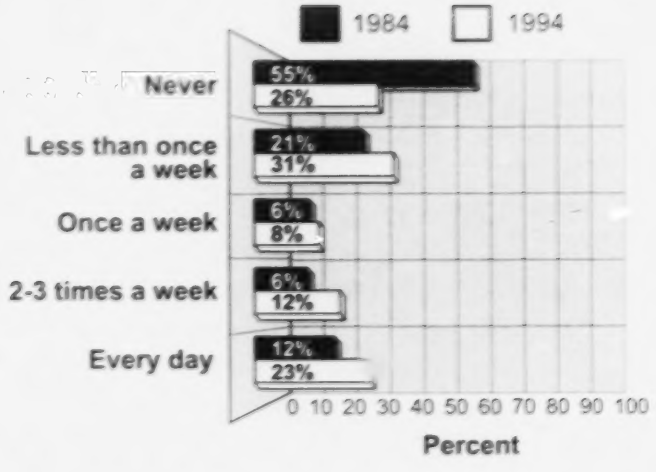
Source: National Center for Education Statistics, National Assessment of Educational Progress 1996 Mathematica Assignment, 1996.

Use of Technology by Schools and Teachers



Source: National Center for Education Statistics, Advanced Telecommunications in Public Elementary and Secondary Schools, Fall 1996.

Percentage of 11th Grade Students Using Computers in the Classroom



Source: US Department of Education, National Center for Education Statistics.

Effectiveness of Technology in the Classroom...

There is a lot of focus on bringing technology to the classroom but, does it really improve teaching and student performance? Numerous studies have consistently reported improvements in student performance, student motivation, and teacher satisfaction.

- Computer instruction is more individualized and can provide instant feedback
- Students learn their lessons in less time with computer instruction
- Students attitude and motivation towards learning is improved

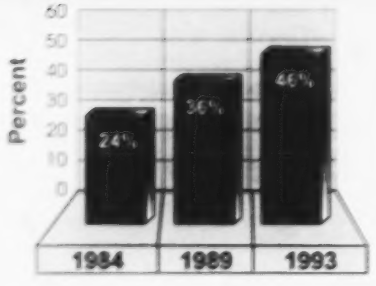
Source: Educational Testing Service, Computers and Classrooms, The Statues of Technology in U.S Schools 1997

Computer Skills are Important in the Workplace...

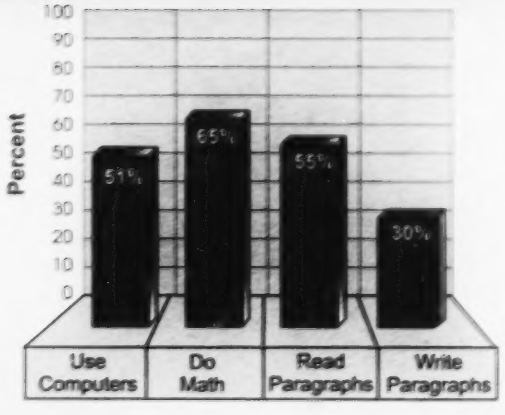
The use of computers on the job has nearly doubled over the last nine years. In 1984, one-quarter of the U.S. workforce reported hands-on computer use at work. By 1993, nearly one-half of the U.S. workforce used a computer.

Source: US Census Bureau, Current Population Survey

Percentage of Workforce Using Computers



Percentage of Non-College Jobs Requiring Daily Use of Computers



Even among non-college jobs, over one-half of these occupations require using a computer at least daily.

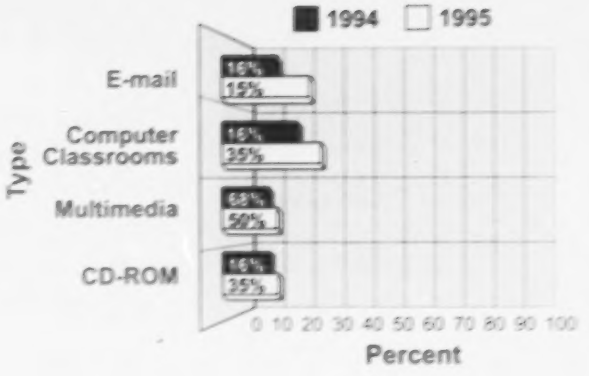
Source: Harry Holzer, What Employers Want, 1996 Russell Sage Foundation

Higher Education is Integrating Technology into the Curriculum...

The number of faculty using technology to complement and enhance their teaching is increasing. Between 1994 and 1995, the number of college level courses using technology has jumped dramatically, although, nearly one-fourth of all courses are held in computer classrooms.

Source: Campus Computing

Percentage of Courses Using Technology

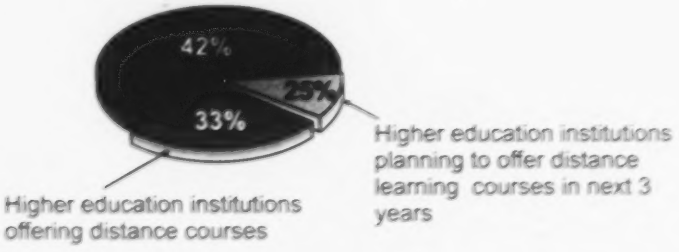


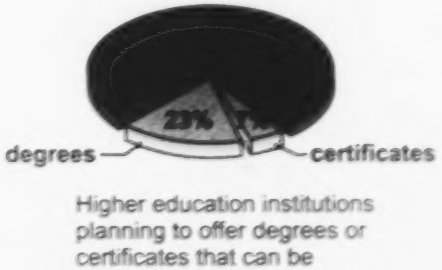
Higher-Ed Collaboration on Technology...

New learning opportunities are emerging. For example, the University of Texas' World Lecture Hall, the Virtual Auto University in Michigan and the Western Governor's Association proposed virtual university highlight how institutions of higher-education are coming together to use technology to expand and increase their reach.

Distance Education is Emerging on College Campuses...

One-third of all higher education institutions offered courses using distance learning technologies. Another one-quarter plan to offer courses using distance education in the next three years. Roughly three out of ten institutions offering distance education courses offer either degree or certificate programs that could be completed via distance education exclusively.


42%
25%
33%
Higher education institutions offering distance courses
Higher education institutions planning to offer distance learning courses in next 3 years

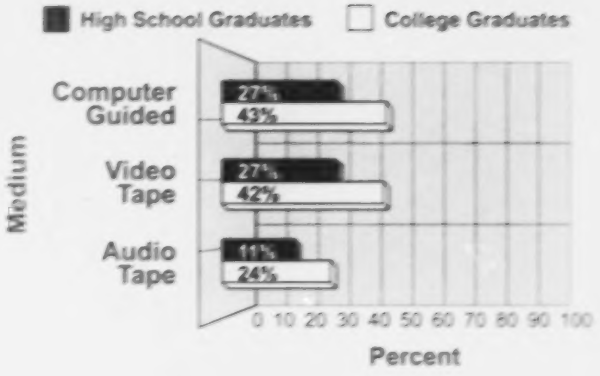

degrees
certificates
Higher education institutions planning to offer degrees or certificates that can be obtained through distance learning courses

Source: National Center for Education Statistics: Distance Education in Higher Education Institutions, Oct. 1997.

Increasing numbers of adults report receiving some work-related training via technology...

A surprising number of adults report receiving some work-related training using technology. And, those with higher levels of education were more likely to receive this type of training compared to those with lower levels of education.

Percentage of High School and College Graduates Receiving Training

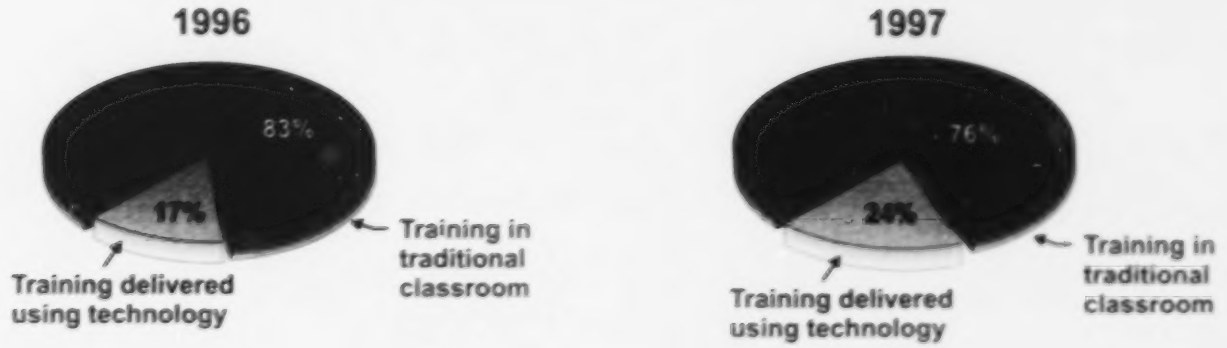


Source: Social & Economic Sciences Research Center, Washington State University. What the Public Wants from Higher Education, 1995.

Business' Use of Technology to Deliver Training..

Companies are changing the way they deliver training. However, among larger firms, the proportion of companies using technology will change even more.

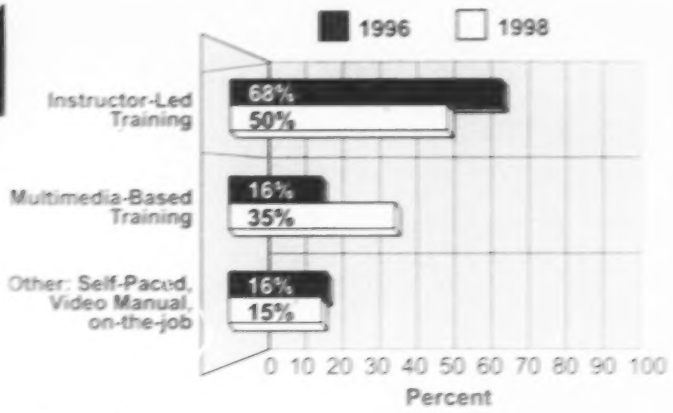
Percentage of Training Using Technology and Training in the Traditional Classroom



Source: Training Magazine, 1997 Industry Report, October, 1997.

Percentage of Training Using Technology

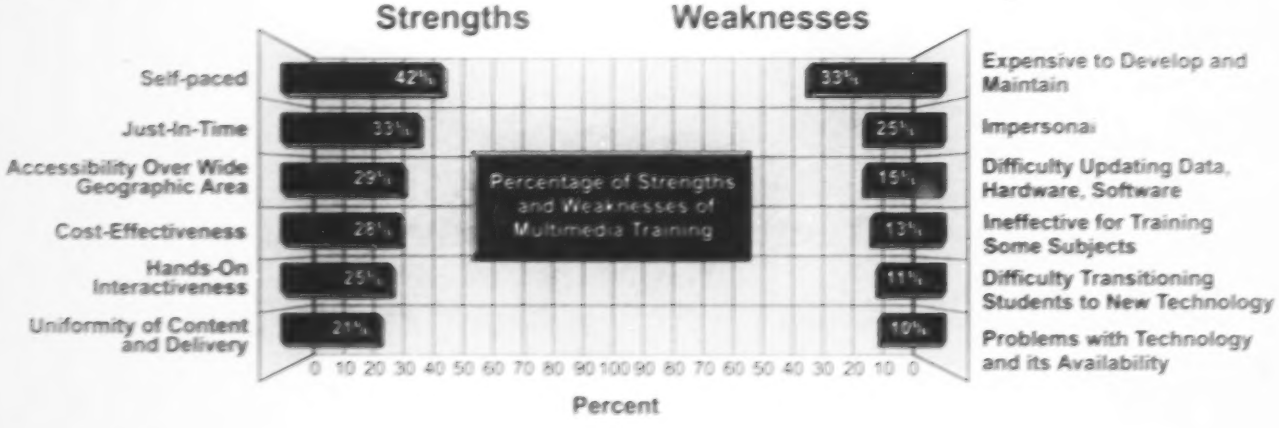
Across Fortune 1000 companies, technology is becoming an even more important medium for delivering training.



Source: Training Magazine, "Multimedia Training in the Fortune 1000", October 1996.

Strengths and Weaknesses of Multimedia Training...

When asked about the strengths and weaknesses of using multimedia training, here is how the Fortune 1000 responded.



Source: Training Magazine, Multimedia Training in the Fortune 1000, September, 1996.

Technology-based Instruction Reduces Costs and Increases Productivity...

Several studies of the impact of technology training have found the following results:

- **30% reduction in training time**
- **30-40% reduction in training cost**
- **Improved achievement when using technology compared to conventional delivery mechanisms**

Source: David McArthur and Mathew Lewis, Untangling the Web, Rand Institute on Education and Training, May, 1997.